Rayat Shikshan Sanstha's
Dahiwadi College Dahiwadi
Department of Physics
Physics Paper IV:- Magnetism II
Class:- B.Sc I

Multiple Choice Questions

Unit :- A.C. Circuits

1. In a series RLC circuit, the phase difference between the current in the capacitor and the current in the resistor is?
a) 00
b) 900
c) 1800
d) 3600
Answer: a
Explanation: In a series RLC circuit, the phase difference between the current in the capacitor and the current in the resistor is 00 because same current flows in the capacitor as well as the resistor.

2. In a series RLC circuit, the phase difference between the current in the inductor and the current in the resistor is?
a) 00
b) 900
c) 1800
d) 3600
Answer: a
Explanation: In a series RLC circuit, the phase difference between the current in the inductor and the current in the resistor is 00 because same current flows in the inductor as well as the resistor.

3. In a series RLC circuit, the phase difference between the current in the capacitor and the current in the inductor is?
a) 00
b) 900
c) 1800
d) 3600
Answer: a
Explanation: In a series RLC circuit, the phase difference between the current in the inductor and the current in the capacitor is 00 because same current flows in the inductor as well as the capacitor.

4. In a series RLC circuit, the phase difference between the current in the circuit and the voltage across the resistor is?
a) 00
b) 900
c) 1800
d) 3600
Answer: a
Explanation: In a series RLC circuit, the phase difference between the voltage across the resistor and the current in the circuit is 00 because they are in phase.

5. In a series RLC circuit, the phase difference between the current in the circuit and the voltage across the capacitor is?
a) 00
b) 900
c) 1800
d) 3600
Answer: b
Explanation: In a series RLC circuit, voltage across capacitor lags the current in the circuit by 900 so, the phase difference between the voltage across the capacitor and the current in the circuit is 900.

6. _____ the resonant frequency, the current in the inductor lags the voltage in a series RLC circuit.
a) Above
b) Below
c) Equal to
d) Depends on the circuit
Answer: a
Explanation: The current in the inductor lags the voltage in a series RLC circuit if a circuit is inductive dominant i.e. if XL > XC $\omega L > 1/\omega C \Rightarrow \omega > 1/\sqrt{LC} \Rightarrow \omega > \omega 0$.
So, the current in the inductor lags the voltage in a series RLC circuit above the resonant frequency.

7. _____ the resonant frequency, the current in the capacitor leads the voltage in a series RLC circuit.
a) Above
b) Below
c) Equal to
d) Depends on the circuit
Answer: b

8. In a parallel circuit, we consider _____ instead of impedance.
a) Resistance
b) Capacitance
c) Inductance
d) Admittance
Answer: d
Explanation: In a parallel circuit, we consider admittance instead of impedance, where admittance is the reciprocal of impedance.

9. In a parallel circuit, we consider admittance instead of _____
a) Resistance
b) Capacitance
c) Inductance
d) Impedance
Answer: d
Explanation: In a parallel circuit, we consider admittance instead of impedance, where admittance is the reciprocal of impedance.

10. Which, among the following is the correct expression for impedance?
a) Z=Y
b) Z=1/Y
c) Z=Y2
d) Z=1/Y2
Answer: b
Explanation: We know that impedance is the reciprocal of admittance, hence the correct expression for impedance is: Z=1/Y.

11. Which, among the following is the correct expression for admittance?
a) Y=Z
b) Y=1/Z
c) Y=Z2
d) Y=1/Z2
Answer: b
Explanation: We know that admittance is the reciprocal of impedance, hence the correct expression for admittance is: Y=1/Z.

12. What is the unit of admittance?
a) ohm
b) henry
c) farad
d) ohm^{-1}

Answer: d
Explanation: The unit for admittance is ohm-1 because the unit of impedance is ohm and admittance is the reciprocal of impedance.

13. As the impedance increases, the admittance _____
a) Increases
b) Decreases
c) Remains the same
d) Becomes zero
Answer: b
Explanation: As the impedance increases, the admittance decreases because admittance is equal to 1/impedance.

14. If the impedance of a system is 4 ohm, calculate its admittance.
a) 0.25 ohm^{-1}
b) 4 ohm^{-1}
c) 25 ohm^{-1}
d) 0.4 ohm^{-1}
Answer: a
Explanation: We know that: Y=1/Z.
Substituting the value of Z from the question, we get Y = 1/4 = 0.25 => Y= 0.25 ohm-1.

15. The admittance of a system is 10 ohm-1, calculate its impedance.
a) 10 ohm
b) 0.1 ohm
c) 1 ohm
d) 1.1 ohm
Answer: b
Explanation: We know that: Z=1/Y.
Z = 1/10 = 0.1 => Z = 0.1 ohm.

16. In A parallel circuit, with any number of impedances, The voltage across each impedance is?
a) equal
b) divided equally
c) divided proportionaly
d) zero
Answer: a

Explanation: In parallel circuits, the current across the circuits vary whereas the voltage remains the same. So, voltage across each impedance is equal in parallel circuit.

17. In a parallel circuit, current in each impedance is_____
a) equal
b) different
c) zero
d) infinite
Answer: b
Explanation: In parallel circuits, the current across the circuits vary whereas the voltage remains the same. So, current in each impedance is different.

18. In an impedance parallel network, the reactive component will _____ the voltage by 90 degrees.
a) Lead
b) Lag
c) Either lead or lag
d) Depends on the circuit
Answer: c
Explanation: In an impedance parallel network the reactive component will either lead or lag the voltage by 90 degrees.

19. In an impedance parallel network, the reactive component will either lead or lag the voltage by _____ degrees.
a) 0
b) 90
c) 45
d) 180
Answer: b
Explanation: In an impedance parallel network the reactive component will either lead or lag the voltage by 90 degrees.

20. In an impedance parallel network, the reactive component will either lead or lag the _____ by 90 degrees.
a) Voltage
b) Current
c) Either voltage or current
d) Cannot be determined
Answer: a
Explanation: In an impedance parallel network the reactive component will either lead or lag the voltage by 90 degrees.

21. The reactive component in an impedance parallel circuit leads the voltage when the current _____ the voltage.
a) Leads
b) Lags
c) Either leads or lags
d) Cannot be determined
Answer: a
Explanation: The reactive component in an impedance parallel circuit leads the voltage when the current leads the voltage.

22. The active component in an impedance parallel circuit will _____ the voltage.
a) Leads
b) Lags
c) Be in phase with
d) Either leads or lags
Answer: c
Explanation: The active component in an impedance parallel network will always be in phase with the voltage in the circuit.

23. The phase difference between the active component of an impedance parallel circuit and the voltage in the network is _____
a) 0
b) 90
c) 180
d) 360
Answer: a
Explanation: The active component in an impedance parallel network will always be in phase with the voltage in the circuit. Hence the phase difference is 0.

24. The quadrature component is also known as?
a) Active component
b) Reactive component
c) Either active or reactive component
d) Neither active nor reactive component
Answer: b
Explanation: The quadrature component is also known as the reactive component because the reactive component forms a quadrature with the voltage.

25. Find the expression for the current I from the given circuit.
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a) $I=I_L$

b) $I=I_R$
c) $I=I_L+I_R$
d) I=0
Answer: c
Explanation: I is the total current in the circuit. Since this is a parallel connection, the total current in the circuit is equal to the sum of the currents in each branch of the circuit. Hence $I=I_R+I_L$.
26. Find the value of IR if I=10A and I_L=8A.
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a) 5A
b) 18A
c) 12A
d) 2A
Answer: d
Explanation: We know that I=IR+IL.
10=IR+8 => IR=2A.

27. In an R-L-C series resonance circuit, if inductance of the circuit is made double and the capacitance is made half, which of the following will be affected ?

A. Resonant frequency

B. Selectivity of the circuit

C. Current at resonant frequency

D. Impedance at resonant frequency

Answer :- B. Selectivity of the circuit

28. When resonant frequency for an R-L-C parallel circuit is given by 1/2 pi root LC, the essential condition is that

A. Inductance must be non-resistive

B. Capacitance must be non-leaky

C. Current is minimum at resonance

D. All of the above

Answer :- D. All of the above

29. A parallel circuit is said to be in resonance when the admittance is purely

A. Capacitive

B. Inductive

C. Susceptive

D. Conductive

Answer:- D. Conductive

30. In a purely resistive, the average power Pav is.....the peak power Pmax

A. Double

B. One-half of

C. One-fourth

D. Equal to

Answer:- B. One-half of

31. In a pure resistive circuit

A. Current lags behind the voltage by 90o

B. Current leads the voltage by 90o

C. Current can lead or lag the voltage by 90o

D. Current is in phase with the voltage

Answer:- D. Current is in phase with the voltage

32. For a purely resistive circuit the following statement is in correct

A. Work done is zero

B. Power consumed is zero

C. Heat produced is zero

D. Power factor is unity

Answer:- D. Power factor is unity

33. In a power system, reactive power is necessary for

A. Power transmission

B. Stabilising the voltage level

C. Counteracting the effect of reactance in the transmission system

D. None of the above

Answer:- C. Counteracting the effect of reactance in the transmission system

34. In a loss free R-L-C circuit the transient current is

A. Oscillating

B. Square wave

C. Sinusoidal

D. Non-oscillating

Answer:- C. Sinusoidal

35. The power factor at resonance in R-L-C parallel circuit is

A. Zero

B. 0.08 lagging

C. 0.8 leading

D. Unity

Answer:- D. Unity

36. Magnitude of current at resonance in R-L-C circuit

A. Depends upon the magnitude of R

B. Depends upon the magnitude of L

C. Depends upon the magnitude of C

D. Depends upon the magnitude of R, L and C

Answer:- A. Depends upon the magnitude of R

37. The quality factor of R-L-C circuit will increase if

A. R increases

B. R decreases

C. Impedance increases

D. Voltage increases

Answer:- B. R decreases

38. Higher the Q of a series circuit

A. Broader its resonance curve

B. Narrower its pass band
C. Greater its bandwidth
D. Sharper its resonance

Answer:- B. Narrower its pass band

39. Q-factor of a parallel resonant circuit is
A. 2 Π f_r/ bandwidth
B. 2 Π × maximum stored energy/energy dissipated per cycle
C. Maximum stored energy/energy dissipated per cycle
D. None of the above

Answer:- B. 2 Π × maximum stored energy/energy dissipated per cycle

40. A high Q coil has
A. Large bandwidth
B. High losses
C. Low losses
D. Flat response

Answer:- C. Low losses

41. Higher the Q of a series circuit, narrower its
A. Passband
B. Resonance curve
C. Bandwidth
D. All of these

Answer:- D. All of these